

### **REMARKS**

Favorable reconsideration and allowance of the present application are respectfully requested in view of the following remarks.

Currently, claims 1-2, 5-15, 23, 29-34, and 36-38, which include independent claims 1 and 23, are pending in the present application. Independent claim 1, for instance, is directed to a multi-component liquid filter that comprises a first filter element and a second filter element. The first filter element defines a surface having a finite surface contact area, and this first filter element contains a charge-modified material. The first filter element is also configured to selectively remove a first contaminant from a liquid when contacted with the liquid. The second filter element of Applicants' independent claim 1 has a pleated surface, which has a surface contact area that is greater than the surface contact area of the first filter element. The pleated surface of the second filter element comprises pleats having an average pitch from about 0.0625 to about 5 inches. The second filter element contains a particulate laminate having two or more layers of filter media, and the second filter element is configured to selectively remove a second contaminant from a liquid. In addition, the second filter element has a filter volume of less than about 6 cubic inches.

In the Final Office Action, independent claims 1 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,980,759 to Proulx, et al. in view of U.S. Patent No. 5,092,990 to Muramatsu, et al. Proulx, et al. describes a filtration medium formed of (a) a depth filter comprising either a cylindrical, seamless fibrous depth filter comprising a nonwoven fibrous mass or a wound depth filter and (b) a pleated screen or surface filter which are retained within a common housing. The depth filter is layered and contains a plurality of filtration media, each having a different percent retention efficiency rating. The surface or screen filter contains one or a plurality of pleated layers, each being formed of a medium having a lower retention rating than that of the layers of the depth filter medium. (Col. 2, line 60 – col. 3, line 24). The surface or screen filter may also contain one or more spacer layers to support the membrane filter sheet. (Col. 6, lines 49-67).

Proulx, et al. completely fails to disclose various aspects of independent claims 1 and 23. For example, Proulx, et al. fails to disclose the average pitch of the pleats on the surface of one of the filter elements, fails to disclose a filter element having a filter volume of less than 6 cubic inches, and fails to disclose a filter element that contains a particulate laminate having two or more layers of filter media. Nevertheless, Muramatsu, et al. was combined with Proulx, et al. in the Final Office Action in an attempt to render independent claims 1 and 23 obvious.

Muramatsu, et al. is directed to a filter device comprising a generally cylindrical casing and a filter element contained in the casing, where the filter element includes a corrugated filter membrane and a reinforcing member for supporting the corrugated filter membrane. (Col. 2, lines 22-30). The reinforcing member may be a corrugated support member made of net and is designed to retain the shape of the filter membrane when changes in the pressure of the flowing water occur. (Col. 2, lines 31-44). Additionally, a pre-coat layer of activated carbon powder particles may be formed over and adhered to the outer surface of the filter membrane. (Col. 4, lines 52-62; Figs. 3 and 4). In the Office Action, it was stated that Muramatsu, et al. "teaches pleated filter with activated carbon" and that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Muramatsu, et al. with the teachings of Proulx, et al. "for removal of organic matter in water treatment." (Final Office Action, p. 2).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all the claim limitations. In this case, the Proulx, et al. and Muramatsu, et al. references, when combined, do not teach or suggest all the claim limitations of independent claims 1 and 23.

For instance, combining the disclosure from Muramatsu, et al. regarding its "pre-coat layer of activated carbon powder particles" with Proulx, et al. still does not teach

Applicants' claimed multi-component liquid filter, where one of the filter elements contains a *particulate laminate having two or more layers of filter media*. Muramatsu, et al. explains several steps involved in forming its pre-coat layer of activated carbon powder particles. Specifically, activated carbon powder particles are charged into the mixing chamber of Muramatsu, et al.'s filter device, and water is supplied into filter device 1, which strips the activated carbon powder particles 35 from the surface of the piled bulk of the activated carbon powder particles 35. Then, eddy currents within mixing chamber 14 ensure that the activated carbon powder particles of Muramatsu, et al. are uniformly mixed with water, and water mixed with activated carbon particles flows upwards through the gap formed between the edge of the bottom plate 12 of the filter unit 4 and the inner peripheral wall of the inner casing 3. As water passes through the filter membrane 17, the activated powder carbon particles entrained by the flowing water adhere on the outer surface of the filter membrane 17 so that the pre-coat layer 37 is formed. (Col. 5, line 47 – col. 6, line 8; Figs. 1 and 4).

This pre-coat layer of activated carbon powder particles is different from Applicants' claimed filter element that contains a *particulate laminate having two or more layers of filter media*. For instance, in some embodiments of Applicants' invention, this particulate laminate may be a three-layered laminate including a charge-modified layer laminated onto both the top and bottom of a layer containing activated carbon. (See Appl. page 22, lines 1-11). Applicants respectfully submit that no such particulate laminate having two or more layers of filter media is taught by Muramatsu, et al.'s pre-coat layer of activated carbon powder particles that may be formed over the surface of the filter membrane.

Additionally, neither Proulx, et al. nor Muramatsu, et al. teaches or suggests a pleated filter element containing pleats having an average pitch of from about 0.0625 to about 5 inches, nor does either reference, alone or combined, teach or suggest a filter element having a filter volume of less than about 6 cubic inches. The Office Action acknowledged that the references do not disclose these limitations of independent claims 1 and 23. However, the Office Action stated that it would have been obvious to one of ordinary skill in the art at the time of the invention "that the dimensions of the

pleats and volume of the filter are determined by optimizing the flow rate, and surface area/capacity requirement of the filter,” and stated that “[d]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.”

Applicants respectfully disagree. In this case, it is the combination of the features of Applicants' claimed multi-component liquid filter—namely, using claim 1, a filter comprising: (1) a first filter element that (a) defines a surface having a finite surface contact area, (b) is configured to selectively remove a first contaminant from a liquid, and (c) contains a charge-modified material; and (2) a second filter element that (a) has a pleated surface with (i) a surface contact area greater than the surface contact area of the first filter element and (ii) pleats having an average pitch of from about 0.0625 to about 5 inches, (b) is configured to selectively remove a second contaminant from a liquid, (c) contains a particulate laminate having two or more layers of filter media, and (d) has a filter volume of less than about 6 cubic inches—that leads to the improved liquid filter of the present invention. For instance, by using filter elements having different surface contact area, the filtration capabilities of each filter element may be optimized (Appl, p. 3, lines 18-24), while, overall, the particular dimensions of the pleats and the size of the filter elements may maximize the filtration properties of the filter without significantly increasing the cost or the size of the filter. Thus, for at least the reasons set forth above, Applicants respectfully submit that independent claims 1 and 23 patentably define over the above-cited references, taken singularly or in any proper combination.

In addition, the above-cited references were also used to reject dependent claims 2, 5-15, 29-34, and 36-38. Applicants respectfully submit, however, that at least for the reasons indicated above relating to independent claims 1 and 23, claims 2, 5-15, 29-34, and 36-38 patentably define over the references cited. However, Applicants also note that the patentability of claims 2, 5-15, 29-34, and 36-38 does not necessarily hinge on the patentability of independent claims 1 and 23. In particular, some or all of these claims may possess features that are independently patentable, regardless of the patentability of claims 1 and 23.

In summary, Applicants respectfully submit that the present claims patentably define over the prior art of record for at least the reasons set forth above. As such, it is believed that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested. Examiner Menon is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this Response.

Please charge any additional fees required by this Response to Deposit Account No. 04-1403.

Respectfully requested,

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